

Government
PublicationsPROPOSED TORONTO AIRPORT II
ENVIRONMENTAL IMPACT STUDY

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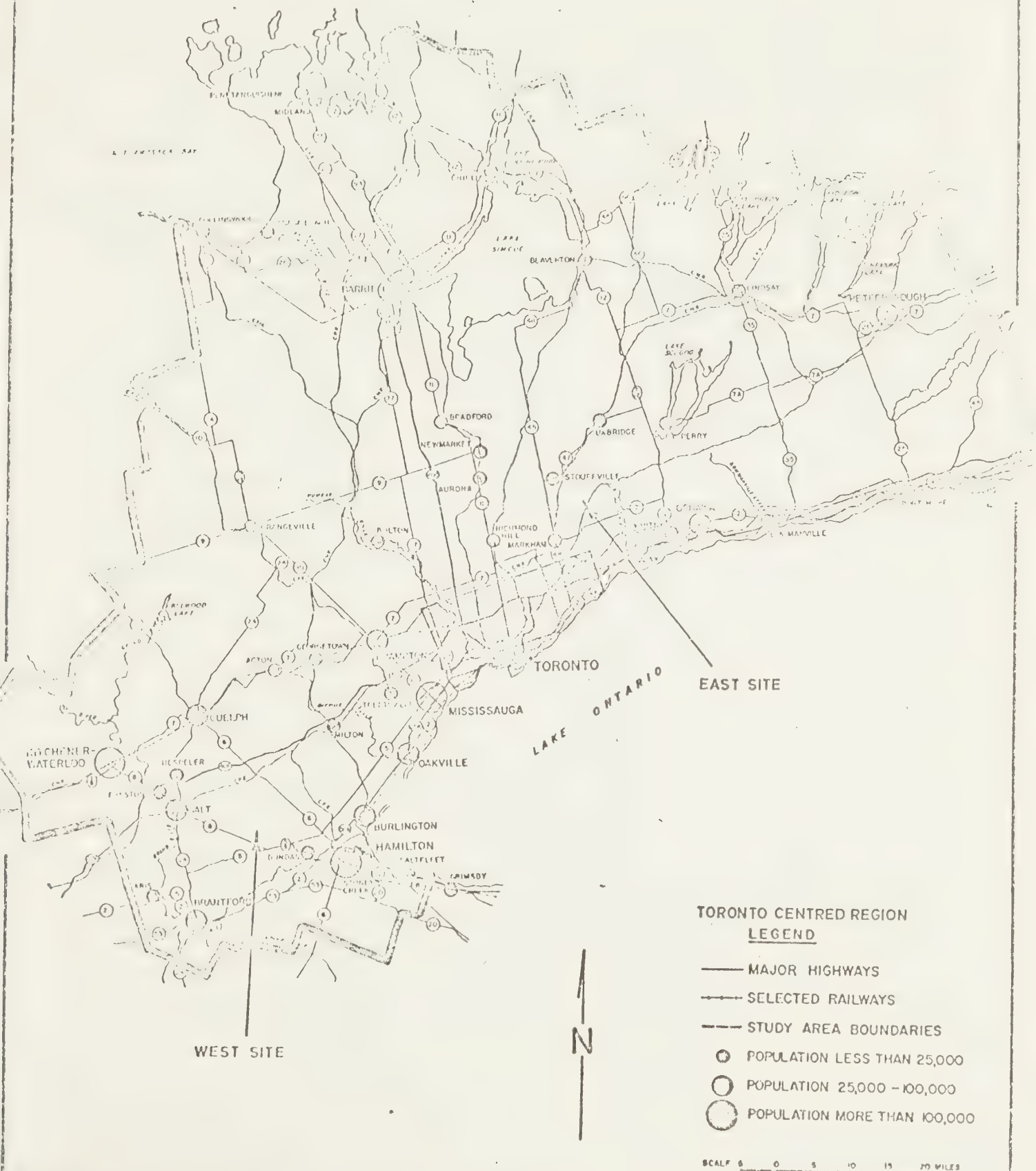
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ABSTRACT

An inventory of natural resources for the two sites considered, revealed that the west site is, in general, superior to the east in all aspects with the exception of soil quality. Whereas the east site is shown to have a greater potential for forestry and wildlife, little of this potential has been realized due to the almost total utilization of the area for agricultural purposes. On the other hand, although the soils of the west site have a lesser all round capability, a great deal of the potential of the area has been realized and is apparent by the abundance and diversity of both vegetative cover (woodlots) and wildlife species. It is apparent that the construction and operation of a modern jet-port facility on either site will have considerable impact. This impact will be more significant, however, on the west site. It is therefore concluded, that in the interest of the natural environment, the second Toronto airport should be located on the proposed eastern site.

I INTRODUCTION

Two proposed sites for a second Toronto Airport have been brought to the attention of the Ontario Department of the Environment. The sites are located east of the City in Pickering Township, Ontario County and west of the City in Beverly Township, Wentworth County. The Biology Section of the Conservation Authorities Branch has been asked to comment on the two sites and suggest which is more suitable from the standpoint of the natural environment, for the purpose of locating an airport facility. The basic approach of this study has been one of evaluating the effect of such a facility on individual resource components of the environment in each area. Combining the findings of these evaluations has, then, given an over-all impression of the impact on the natural environment of each site.



II. PRESENT STATUS OF THE AIRPORT SITES

The purpose of this section is to discuss, in general, environmental aspects of each site including size, location and resources present.

1) Location and Size

East

This site is located in the Duffin Creek watershed on the west branch of Duffin Creek. Its area falls principally in Pickering Township of Ontario County and lies approximately 24 air miles northeast of downtown Toronto and 30 air miles from Toronto International Airport. The western quarter of the site lies in Markham Township, York County and encroaches slightly on the Rouge River watershed. The landscape is gently rolling with a local relief of between 20 and 25 feet. The site is well-drained with river valleys deeply cut into the glacial till of the area. Dense growths of white cedar are present along the major river valleys.

Only 6.5% of the east site area is wooded. County forests are non-existent and the remaining woodlots are unmanaged and of poor quality. Almost 6% of the site is in grass or meadow while over 88% is improved land for agriculture. Small dairy and beef cattle operations are characteristic of the area while a few farms raise horses. Judging by the general



MAP 2
PROPOSED EAST
AIRPORT SITE



SCALE 1 INCH=4 MILES

condition of buildings on the site, few, if any of the farm operations appear to be overly prosperous.

Although the site covers some 21 square miles, there are no nucleated settlements within its boundaries. Older farmsteads exist throughout the site as do a number of new and modern single-family dwellings. Closely associated with site perimeter are several established rural settlements, these being: Stouffville, Altona, Claremont, Brougham and Green River.

Areas to the south, west and east of the site boundaries are similar in topography as well as present land use. To the north, however, is the hilly topography of the Oak Ridges moraine, from which rise the headwaters of the Duffin Creek.

West

The proposed western airport site lies approximately 16 air miles northwest of downtown Hamilton and 36 air miles from the Toronto International Airport. This site covers about 23 square miles and is situated on two watersheds. The eastern third of the area lies in the Spencer Creek watershed and the western two thirds lie in the Fairchild Creek watershed of the Grand River system. The site covers the entire central region of Beverly Township, Wentworth County.

The local relief of the site is generally 10 to 15 feet but becomes considerably greater in the northeast due to the presence of the Westover drumlin field. The creek valleys are very shallow as the streams are forced to meander over thin

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SCALE 1 INCH = 4 MILES



soils underlain by limestone bedrock.

Almost 18% of the west site is wooded while 70.5% is cleared and suitable for agriculture. 8.8% is grassed or meadow land. 785 acres of County Forests are located on the site and managed by the Department of Lands and Forests. Dairy cattle and livestock are the major forms of agriculture on the site.

Included within the western site's 23 square miles are the two settlements of Rockton and Westover. Located outside of the site, but close to its boundaries are several more villages including Freelton, Strabane, Hayesland, Peter's Corners, Troy, Branchton, Sheffield, Kirkwall and Valens.

This site has a higher recreational potential than the eastern site and as such is being utilized to a greater degree for this purpose at the present time. A variety of upland game throughout the site offers excellent hunting, while the waters of the Spencer Creek, in areas, support native populations of brown and brook trout. The Department of Lands and Forests is involved quite actively in management programs on this site, examples of which are stocking of portions of the Spencer Creek with trout and management of County forests and woodlots. Both the African Lion Safari and the Westover Pioneer Village are located on the site, while the Valens and Beverly Swamp Conservation Areas are found immediately to the north.

The topography of the region surrounding the western site is quite varied and only the area to the east resembles that of the site itself to any degree. To the north is the Beverly Swamp, a poorly-drained area of peat and muck, the Westover drumlin field and the limestone barriers of the Flamborough Plain. To the west, extensions of limestone plain lead to the Galt moraine while to the south of the site, an extension of the Norfolk sand plain has been greatly modified to form a rugged and hilly landscape.

2) East Site Natural Resources

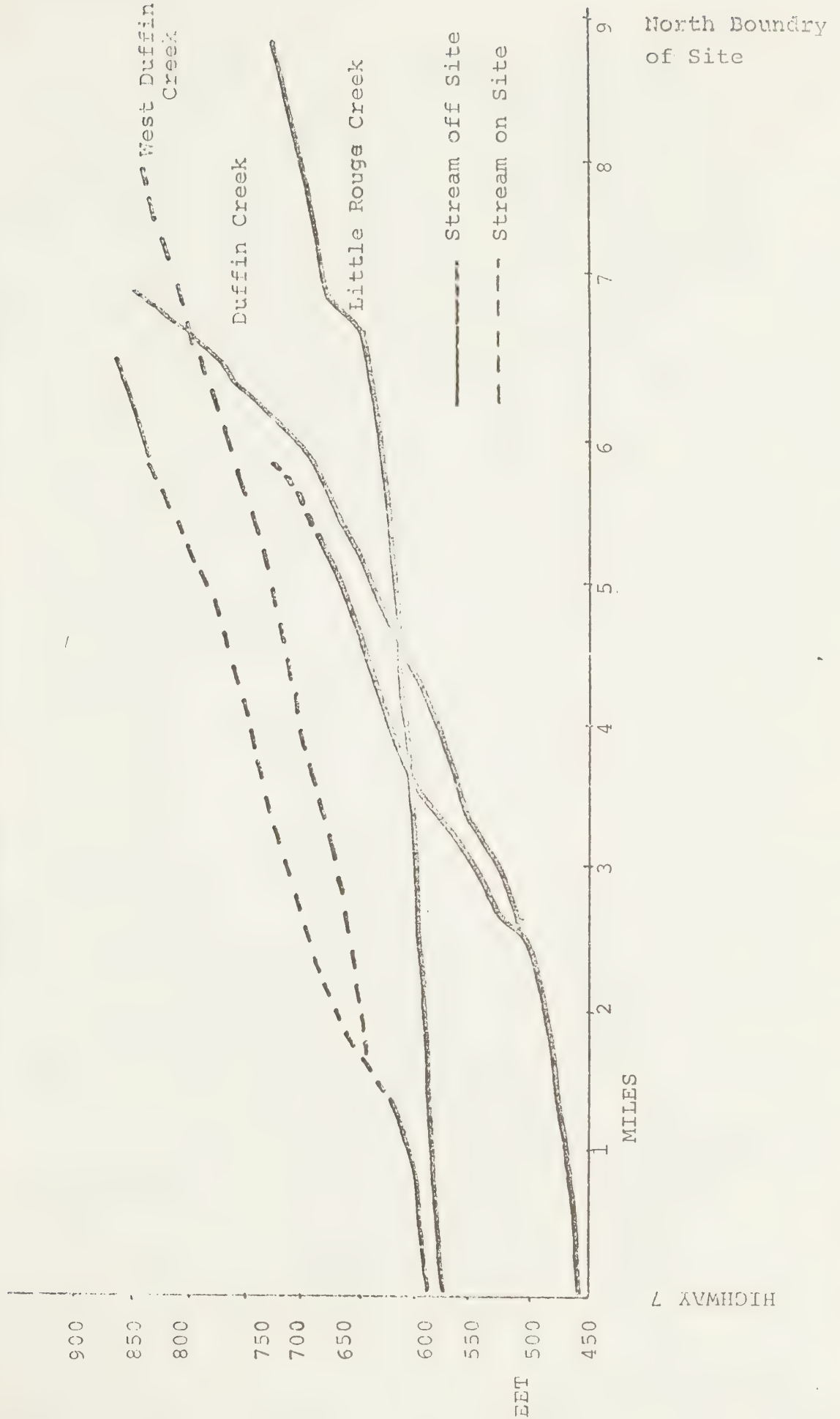
a) Physiography, soils and minerals

Elevations in the eastern site area range from a hilltop in the northwest at 889 feet above sea-level, to 650 feet along the southern boundary of the York-Ontario County border. The west sector of the site offers the greatest local relief while generally it is between 20 and 25 feet over the remainder of the site.

The east site is centred on the West Duffin Creek between the main branch of Duffin Creek and the Little Rouge Creek. All water courses in this vicinity flow south from the rugged hills of the Oak Ridges moraine, where they rise, and have become deeply incised in the underlying clay and till of the South Slope. This slope is a major physiographic region extending from the Niagara Escarpment to the Trent River. In addition to the incised valleys of the main streams, gullies

FIGURE I

Stream Profile of Duffin Creek, West Duffin, and Little Rouge Creek
(From Highway 7 to the north boundary of the site)



have been cut by intermittent drainage causing east-west side roads of the area to cross a number of small creek valleys. Stream profiles of the area are steep. The West Duffin Creek for example, falls an average of 38 feet per mile and the main Duffin Creek compares at 25 feet per mile within the proposed eastern site proper.

The soils of the east site have developed on glacial deposits of till and lacustrine clays and silts (Peel Plain), which are underlain with a bedrock base of Utica Shale. The major soil materials are therefore loamy shales, clay loams, and gravelly sandy loams. From these parent materials the following soil series have evolved and comprise the most extensive types of soil on the site.

Woburn Loam

- moderately sloping topography
- well drained
- few surface stones
- mainly supports hay, pasture and grain
- care must be taken to prevent erosion

Milliken Loam

- gently sloping topography
- moderately well drained
- slightly stoney
- mainly supports hay and grain
- inadequate drainage for wheat and alfalfa

Peel Clay Loam

- very gently sloping topography
- imperfectly drained
- very high fertility
- produces high yields of grain, corn and hay, with proper drainage

Cashel Clay

- moderately sloping topography
- good drainage
- susceptible to erosion
- used for dairying and general farming

Brighton gravelly
sandy loam

- very gently sloping topography
- well drained
- sometimes surface boulders
- low fertility
- droughty in mid-summer
- tobacco and market garden crops

The variety of soils present on the eastern site qualify it without exception as Class 1 agricultural land.

One gravel pit can be found in the report area to the northeast of Brougham. Aside from this pit, mineral extraction is virtually non-existent within the eastern site.

b) Air

The air quality of the eastern site generally speaking is good. Although it lies to the east of the City of Toronto, it is far enough east and enough to the north as to remain unaffected by any atmospheric pollutants contributed by the city.

c) Water

The largest portion of the east site is drained by the Duffin Creek and its tributaries, while a small area on the west side of the site is included in the drainage of the Little Rouge Creek, which is a part of the Rouge River watershed. The little Rouge Creek rises as a coldwater stream in the Oak Ridges moraine, but by the time it passes along the west side of the site, (see map 4), its temperature has warmed considerably and it is no longer suitable for trout. Bass, however, have been taken at this point. Data on the

water quality of the Little Rouge Creek is not available. Duffin Creek is a larger watercourse and has cut a deep valley into the landscape (see Figure 1). Where the stream rises from springs in the Oak Ridges morain, it flows through hardwood forests and so remains cold. By the time it reaches the site, however, it has warmed considerably. Where temperatures were 50 to 55 degrees fahrenheit at the source and good for trout, they are 65 to 70 degrees fahrenheit as the creek enters the lake and generally of poorer quality. Dissolved oxygen is close to saturation along most of this stream. For complete data on the stream water quality see Appendix 2.

Public access to the main stream of Duffin Creek is limited to five parks along its course, as it flows almost completely through private land. Four of the five parks are north of the Town of Pickering and one is located within the town. Three of the parks are privately owned.

West Duffin Creek flows entirely through private land with public access in the area of road-crossings only. As the stream flows for the most part through farmland without vegetation along its banks, the water temperature is high ranging up to 75 degrees fahrenheit. Dissolved oxygen is high along the west branch of Duffin Creek and there are trout in one of its tributaries. Apart from this, no other game fish species are found along the creek in the vicinity of the eastern site. For complete data on water quality see Appendix 1, and for a list of species found in the Duffin Creek watershed see Appendix 4.

Flooding is a problem on the lower reaches of Duffin Creek, with numerous floods having occurred since the early 1830's. For protection against the recurring flood problem, dams have been built at Greenwood, Whitevale and Altona and others have been planned for the area.

The rolling topography of the eastern site is typical of a well-drained area. Along with the steep stream gradient of the west Duffin Creek, the land use of the area, being primarily agriculturally-oriented, contributes to the well-drained nature of the eastern site through promotion of rapid runoff.

d) Vegetation

Soils information for the two sites contained in County soil surveys, was correlated with forestry data from Conservation Reports, to obtain a general overview of the vegetation within each site. The results of the analyses were then combined with species identification from field work and with Department of Lands and Forests Inventory maps produced from 1954 air photos. From comparisons of these air photos with those of 1971, it was clear that the woodlots and general vegetation pattern of both sites had changed very little over the last 17 years. This apparent lack of change was substantiated by field representatives of the Department of Lands and Forests.

From these sources of information then, it is quite apparent that the present vegetative cover on the east site, lacks any significant degree of diversity. Because the soils on the site are so productive, the area has, in the past, been

MAP 4
VEGETATION-EAST SITE



almost totally cleared of forest cover to permit extensive cultivation. Data for the following chart calculated from the Forest Inventory maps, demonstrate the absence of any significant amount of natural forest due to the predominance of agricultural activity.

<u>LAND USE</u>	<u>ACREAGE</u>	<u>% of TOTAL SITE ACREAGE</u>
Total Site	3,440	100%
Woodlots	544	4.0%
Grass or Meadow	700	5.2%
Wooded Pasture	330	2.5%
Brush or Alder	None	0%
Developed Agricultural Land	1,866	88.3%

The 1955 Conservation Report covering the area of the east site, indicated that this area is a part of the Great Lakes - St. Lawrence Forest Region. Sugar maple and beech represent the prevailing association of forest trees and occur with species of basswood, soft maple, eastern hemlock and elm. The region was drastically affected by the Dutch Elm disease, eliminating in total, almost all trees of the species. Poorly-drained areas, primarily along the river courses, accommodate white cedar while black cherry is present on fertile, well-drained upland soils. Hawthorn is evident throughout the site as a scrub type of growth. Identification of the above-mentioned forest species present was made using listings on the Forest Inventory maps and site inspection.

The total wooded portion of the site amounts to only 6.5% of the entire area. The forested regions are found predominantly along creek valleys and between farm fields as windrows. There are no County forests and very few private woodlots, so while there are a variety of tree species on the site, they number very few and cover only a small area.

Similar vegetative cover exists to the south and west of the site. The Oak Ridges moraine to the north and a large percentage of bottomland to the west, experience a greater degree of woodlot cover.

e) Wildlife

The most common species of wildlife on the eastern site are: ruffed grouse, cottontail rabbits, European hare, ground-hogs, and raccoons. White-tailed deer are not common but their local population is increasing, especially to the north of Uxbridge Township where there have been open seasons on deer during the last two years.

There is sufficient habitat for ring-necked pheasants and the site is being stocked with these birds by the Department of Lands and Forests.

As on the western site, the presence of rodent populations has attracted numbers of birds of prey. Migrant waterfowl no doubt pass over the site, but suitable habitat for nesting and feeding is extremely limited in the area. For this reason the eastern site is not productive in terms of nesting or

migrant waterfowl.

Following are the Ontario Land Inventory Ratings for wildlife on the eastern site:

- Class 1: Highest Production
- Class 2: Good Production
- Class 3: Above Average Production
- Class 4: Average Production
- Class 5: Below Average Production
- Class 6: Poor Production
- Class 7: Almost No Production

The use suitability of an area is the ability of the area, in its present condition, to support wildlife. Use suitability ratings for the east site, as per the Ontario Land Inventory ratings, are as follows:

<u>Species</u>	<u>Rating</u>
white-tailed deer	5
ruffed grouse	5
Hungarian partridge	2 to 3
European hare	2 to 3
migrant geese	4 to 5
puddle ducks & duck hunting	7
ring-necked pheasant	4 to Nil

Use capability of an area is the potential of the area to support wildlife. The use capability ratings for the east site, as per the Ontario Land Inventory ratings, are as follows:

<u>Species</u>	<u>Rating</u>
white-tailed deer	1 to 2
ruffed grouse	1 to 2
Hungarian partridge	2 to 3
European hare	2 to 3
migrant geese	4 to 5
puddle ducks & duck hunting	7
ring-necked pheasant	4 to Nil

Generally speaking, with respect to terrestrial wildlife species, it is apparent that the potential of the east site for the purpose of providing wildlife habitat is good. While the potential in this area is favourable, however, the fact remains, that it might take as long as 20 to 30 years for it to be realized, under an intensive management programme for this purpose.

3) West Site Natural Resources

a) Physiography, soils and minerals

Elevations on the west site range from 950 feet above sea-level in the Westover drumlin field, to 794 feet at the southwestern boundary. Local relief is greatest in the drumlin field to the northeast, where it reaches 80 feet. Generally, however, the local relief of the report-area varies from 10 to 15 feet throughout the site. The drainage divide between Lake Erie and Lake Ontario passes through the centre of the site as it drops south from the Galt end moraine and follows

extensive outcroppings of limestone. The main channel of Spencer Creek crosses the southeast portion of the site while the headwater region of the West Spencer Creek is included entirely within the report-area. Fairchild Creek and one of its branches, Barlow Creek, flow from the western sector of the site into the Grand River watershed. This site, for the most part, is poorly-drained with very shallow drainage channels which are restricted in their development by sub-surface layers of bedrock. Fairchild Creek has a gentle gradient dropping only 8.3 feet per mile within the site, (see figure 2). Spencer Creek is not appreciably greater at 10 feet per mile, (see figure 3).

Located on a westerly extension of the Flamborough plain, south of the Galt end moraine and just touching the Norfolk sandy plain, the soils of the west site have developed on both pleistocene deposits and limestone plains. Drumlins to the northeast are intensively cultivated as they offer loamy, well-drained soils. Soils over much of the remainder of the site are stoney with varying textures and drainage characteristics. Following are the most common soils of the site:

Farmington Loam

- level topography
- depth never exceeds 12 inches over bedrock
- well drained
- bedrock fragments throughout
- moisture deficient
- used for permanent pasture

Guelph Loam

- gently rolling topography
- depth 12 to 36 inches over bedrock
- well drained
- susceptible to erosion and gully-
ing on slopes
- contains bedrock fragments
- supports forage crops

Grimsby Sandy Loam

- moderately sloping topography
- varying depth 24 inches or better
- well drained
- droughtiness and erosion are
problems
- irrigation has been attempted
- supports forage crops

Brant Silty Loam

- gently rolling topography
- well drained
- also shallow
- high agricultural value for
forage and row crops
- erodes very easily

Although soils of the west site do not have the agricultural capability of those on the east site, they fall generally into classes 3 to 6 and as previously indicated, approximately 70.5% of the area is suitable for agricultural practices.

Nine sand and gravel pits can be found within the site boundaries. These are all found in relatively small deposits of beach and outwash gravels associated with abandoned shorelines of glacial lakes. The shorelines most frequently have survived along the southern exposures of the drumlins in the northeast sector. Easily accessible dolomitic limestones can prove valuable as mineral reserves for the construction industries of the Hamilton-Galt area. The potential for increase of this extractive industry on the site is very great.

b) Air

The air quality of the western site is generally good, although it tends to be affected significantly by an east wind. The easterly air flows reduce visibility in the vicinity of the west site by transporting finely divided particulate matter from the City of Hamilton's industrial area into the site region. Also, due to its close proximity to the Beverly Swamp, the site tends to experience ground fog conditions at more frequent intervals than would be expected on a site not associated with such a topographical feature.

c) Water

As mentioned earlier in the discussion under physiography, the western site is drained by three water courses, the west branch of the Spencer Creek, the Fairchild Creek and Barlow Creek. The latter two creeks are part of the larger Grand River watershed and little information is available relative to their water quality or flows through the site area. The waters of Fairchild Creek become warm in the summer and no game fish species are found along its course as it passes through the site. A partial analysis of water quality was carried out in 1962 at Troy, located south of the site. The results of the analysis, which can be seen in Appendix 3, would indicate that the Fairchild Creek is in fair condition in terms of water quality. The possibility of locating dams at St. George and Harrisburg have been explored, but no action has yet been taken.

FIGURE 2

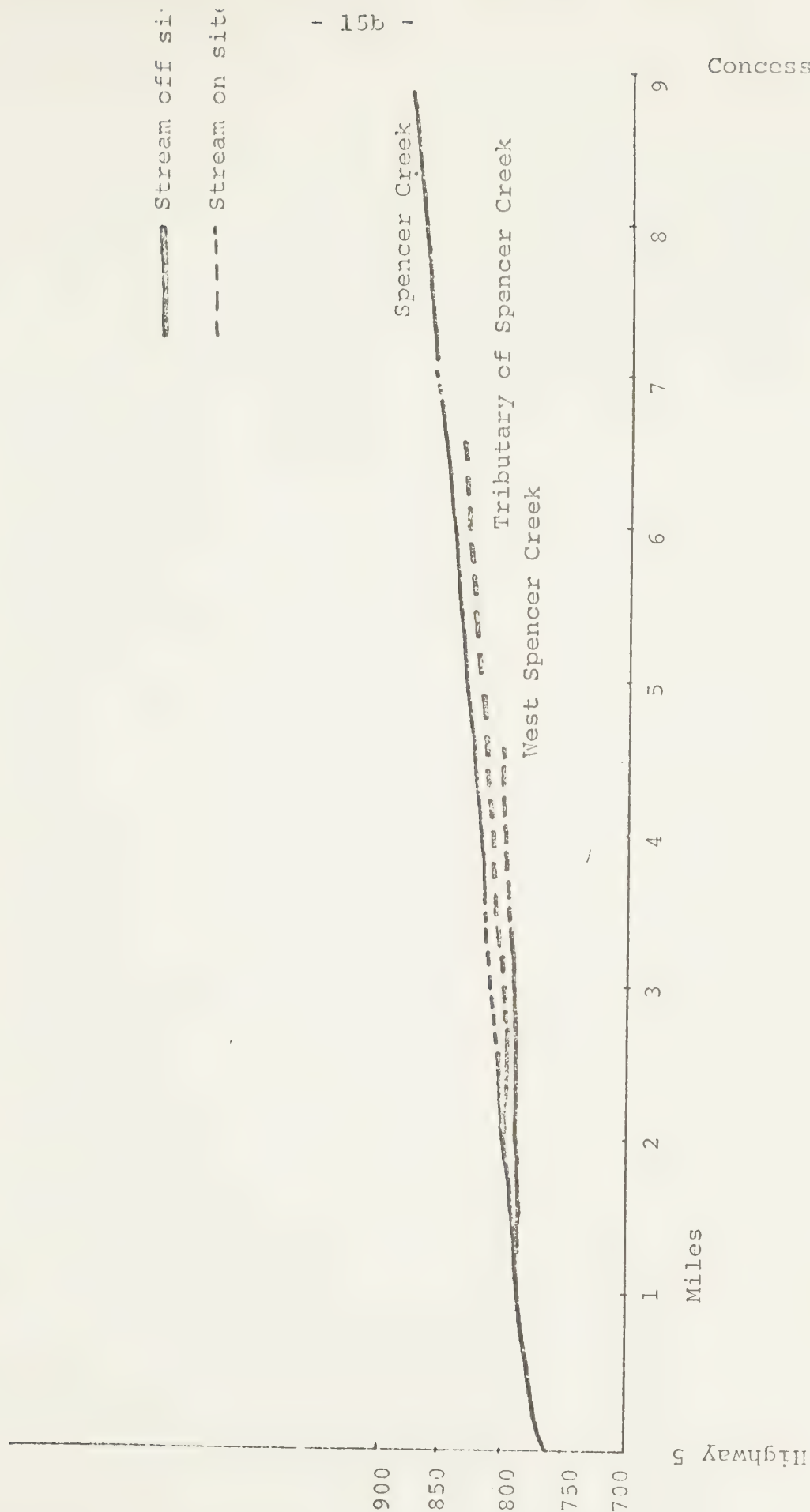
Stream Profile of Fairchild and Barlow Creeks

(From Highway 7 to Concession 7)



FIGURE 3

Stream Profile of Spencer and West Spencer Creeks
(From Highway 5 to Concession 7)



The Spencer Creek watershed has been studied in greater detail as it periodically floods the Town of Dundas as well as serving that town and the Village of West Flamborough as a water supply. The streams of the watershed are in most cases permanently flowing. To prevent floods from occurring during spring runoff, control dams have been constructed on Spencer Creek near Christie's Corners, just south of the site and at Valens, in the headwaters area of the creek.

The banks of the Spencer Creek and its tributaries are quite unstable and the streams carry quite a large silt load from the resulting erosion. The water quality of the creek has been well studied and a summary of data taken at Valens in 1971 is included in this report (see Appendix 3). Further data taken in the summer of 1970 along the watercourse is also given in the Appendix of this report. The creek, where it enters the site, carries large quantities of nutrients contributed, to a great degree, by the swamp upstream. As it passes through the site, the creek is further enriched by the addition of organic material from associated agricultural lands. The creek is not organically over-loaded, however, as the oxygen concentration remains near the saturation point. The growth of algae is limited by the turbidity of the stream which restricts the penetration of sunlight, and by the lack of a proper substrate. At West Flamborough the water quality deteriorates and below Christie's Corners the coliform count makes the water unfit for recreational use. The source of the

main branch of the Spencer Creek is a number of cold water springs rising in the Galt end moraine. The stream remains quite cold until it leaves the Beverly Swamp. From this point, however, due to lack of sufficient vegetative cover along stream banks, the slow-moving waters are warmed by solar insolation. West Spencer Creek, rising within the proposed western site, has its headwaters in the area south of Westover. Temperature records indicate, that this branch becomes quite warm in the summer months, although in the summer of 1971, a brown trout was taken from the stream at a point just south of the site. This would suggest that there are pools of colder water along the watercourse and that, to a degree, the stream is biologically productive. A second major western tributary of Spencer Creek arises in the Westover drumlin field and flows south connecting it with the main branch just south of the Site. Temperature records on this creek indicate that water remains cool all summer. While fish such as dace and suckers were taken in the 1971 summer survey, no trout were caught at this time. The streambed of Spencer Creek is rich in benthic fauna which supports a sizeable trout population downstream as far as Station 4. A complete list of organisms is recorded in Appendix 5 of this report. The creek is stocked annually by the Department of Lands and Forests with the result that fishing pressure is high on the fringe area of the Beverly Swamp and as well along sections of the creek downstream.

Spencer Creek and its tributaries are a valuable recreational stream in this part of Ontario. Much of this value is imparted by the Beverly Swamp lying just north of the site. The swamp, with an area of approximately 2,200 acres, acts as a water storage and supply area for Spencer Creek and to a lesser extent, Fairchild Creek. Much effort has been carried out by the Conservation Authorities Branch and the Department of Lands and Forests to preserve it for this reason.

Since the gradients of the creeks through the west site are so shallow (approximately 10 feet per mile), the area is very poorly drained. The presence of limestone bedrock at or close to the surface restricts the depth of the stream channels and prevents the development of a good drainage system in the area. This it could be expected, would have serious consequences relative to the development of an airport facility on this site.

While the proposed western site does not lie on the main branch of the Spencer Creek, its affect on the western tributaries of the creek will in turn influence the main channel.

d) Vegetation

Information in the soil survey of Wentworth County(1967) was correlated with Forestry data from the 1955-58 Conservation Reports in order to obtain a general overview of the vegetation within the west site. The results of the analysis were corroborated with species identification from field work and the Department of Lands and Forests Inventory maps produced from 1954 aerial photographs. Although the maps were dated, the

woodlots and vegetation pattern had changed very little when compared with the 1971 photos. This apparent lack of change was substantiated by district personnel of the Department of Lands and Forests.

A greater variety and quantity of vegetative cover can be found on the western site. Shallow, poorly-drained soils provide a substantial area of wet lands, while considerably more forests, pasture and scrub lands are also present.

The following figures, as compiled from the Forest Inventory maps, provide comparative acreages of vegetative cover and developed agricultural land, with the total acreage involved.

<u>Land Use</u>	<u>Acreage</u>	<u>% of Total Site Acreage</u>
Total Site	14,720	100%
Woodlots	2,197 (785 in County Forests)	14.9%
Grass or Meadow	1,300	8.8%
Wooded Pasture	400	2.7%
Brush or Alder	445	3.1%
Developed Agricultural Land	10,378	70.5%

Data from Conservation Reports indicate that this site is included within the Great Lakes - St. Lawrence forest region and is typified, in well-drained upland areas with such species as sugar maple, beech and white elm in association with basswood, white ash, black cherry, hemlock and silver maple. Distinctive local combinations of tree species have

developed in response to poorly-drained river bottoms, swamp and upland topography. White cedar in association with balsam, red maple, white birch, and white pine is accommodated by poorly-drained limestone uplands, while the swampy, low lands are predominantly occupied by silver maple-white elm and black ash-white elm-red maple cover types. Aspen with associated balsam, poplar, red cherry and paper birch survive throughout the site as pioneer cover types and represent the major invasion of species in abandoned fields and pastures. Most wet (willow and dogwood) and dry (hawthorn and sumach) scrub land species flourish as a second growth in formerly-cleared but now abandoned areas.

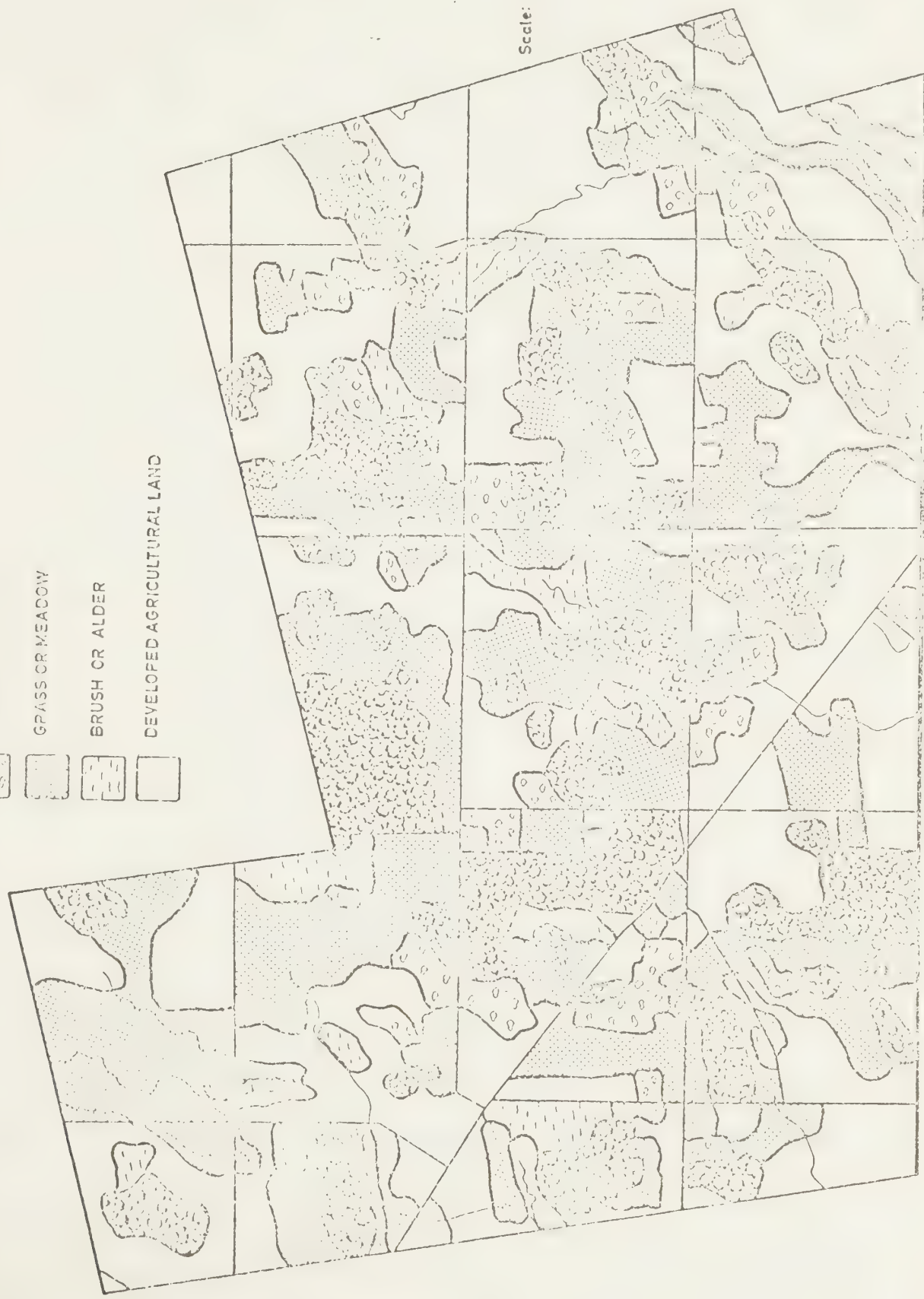
Within the proposed site, the Department of Lands and Forests manages a total of 785 acres of forest in three separate County Forest plantations. Red and white pine are the major species cultivated, with natural inclusions of some hard maple, ash, cherry, beech, ironwood, white and red cedar, and spruce.

The surrounding areas to the east, west and south of the site have similar vegetation and land use patterns as those encountered within the site. The northern boundary fringes on one of the most unique biological areas in the Toronto-Centred region, namely the Beverly Swamp. This fact is readily recognized by the Hamilton Region Conservation Authority which has already obtained 1,100 acres of the swamp and is anxious to expand its holdings. The Beverly Swamp is mainly dominated

VEGETATION-WEST SITE

MAP 5

- KEY
- FOREST
 - WOODED PASTURE
 - GRASS OR MEADOW
 - BRUSH OR ALDER
 - DEVELOPED AGRICULTURAL LAND



Scale: 1:50,000

by hardwood trees and includes forest types of white elm, silver maple, aspen and white cedar in association with black ash, white pine, hard maple, basswood and tamarack.

Based on existing quantity and diversity of vegetative cover alone, the western site and its surrounding area have much more to offer in terms of aesthetic beauty than does the eastern site.

c) Wildlife

A herd of 50 to 60 white-tailed deer range throughout the eastern portion of the Beverly Swamp, just north of the western site.

In the Hyde Tract of the Wentworth County Forest, the Department of Lands and Forests report the most substantial populations of woodcock in the district. The County Forests also provide habitat for ruffed grouse and some bobwhite quail. Ring-necked pheasants and Hungarian partridge utilize the meadow grasslands in the southern portions of the site. Large numbers of cottontail rabbits are found throughout the area, while the European hare population is on a cyclic decline. Culling of branches and dead trees in the County Forests is now integrated with wildlife management plans by the Department of Lands and Forests. In the 335 acre Rockton Tract, brush piles are being constructed to last as long as 15 years.

The western site falls directly below the Dundas-Valens flyway of the whistling swan. On one private pond within the

site, as many as 1,500 ducks per night touch down, in the fall. Geese migrate over the site but a major flyway is not located near the area.

Populations of small mammal species (i.e. rabbits, mice, voles, and other rodents) are sufficient in the area to attract numbers of birds of prey. During a reconnaissance of the site, hawks were observed, as well as crows. There was ample evidence of songbird nesting.

Following are the Ontario Land Inventory ratings for wildlife on the Western site:

- Class 1: Highest Production
- Class 2: Good Production
- Class 3: Above Average Production
- Class 4: Average Production
- Class 5: Below Average Production
- Class 6: Poor Production
- Class 7: Almost No Production

Use Suitability - that is, the ability of the area in its present condition to support wildlife: (as per the Ontario Land Inventory (OLI) ratings)

white-tailed deer	5 to 6
ruffed grouse	5 to 6
Hungarian partridge	4
European hare	4
migrant geese	7
Puddle ducks & duck hunting	7

Use Capability - that is, the potential of the site to support wildlife: (as per the Ontario Land Inventory ratings)

white-tailed deer	3
ruffed grouse	3
Hungarian partridge	4
European hare	4
migrant geese	4 to 5
Puddle ducks & duck hunting	7

While the potential of the west site for the purpose of wildlife habitat is not considered as Class 1, it certainly does not lack potential. In fact, at the present time, the region of the western site is realizing a good deal of its considered potential as is apparent by the numbers and diversity of wildlife species present.

III ANTICIPATED IMPACT

The presence of an airport on either the east or west site will certainly impose a significant impact on the natural environment of the areas. For the purpose of discussing such an impact, this section will concern itself with two phases of a modern jetport on each site; firstly: the impact resulting from the construction of the airport facility, and secondly: the impact resulting from its day-to-day operation.

1) Construction

a) Air

East and West

The only problems envisaged during the actual construction of the airport relative to air quality will be created by dust. Dust control is easily implemented, by physical wetting of construction roads with water or by the application of a chemical dust control agent. Soil stock piles could also be handled similarly, to retard wind-borne dust particles.

b) Water

East

During the construction of the airport, extensive levelling of topography over the site would be required for the construction of runways, buildings and additional roads. Digging would also be essential for the installation of underground services. These

activities it is anticipated, would cause a great disruption of present drainage patterns on and around the site. The soil type of the eastern area is that of an easily erodible sandy loam. While the main stream valley of Duffin Creek lies about a mile east of the site, several other major tributaries pass through the site. These tributaries would be greatly affected by silt generated during construction phases. It would be necessary to straighten the channel of the West Duffin Creek and its tributaries because they presently meander over the western portion of the site. This could be done by the use of culverts or by channelization. In any case, without proper controls, large quantities of silt would be generated affecting water quality as well as stream flow. As previously discussed, Duffin Creek has considerable flood potential. Problems have arisen in the past from lack of adequate culvert capacities downstream. If excess silt is picked up by the creek during the construction phase, it would disperse downstream, thereby affecting water quality, reducing the capacity of storage reservoirs, blocking culverts, and increasing the flood hazard significantly.

Apart from silt pollution, stream quality would also suffer during the construction phase, from accidental spills of gasoline and oil, and chemicals such as calcium chloride (a dust-control chemical) which would enter water course through runoff. These materials would eventually enter the main tributaries of Duffin Creek and cause further problems downstream.

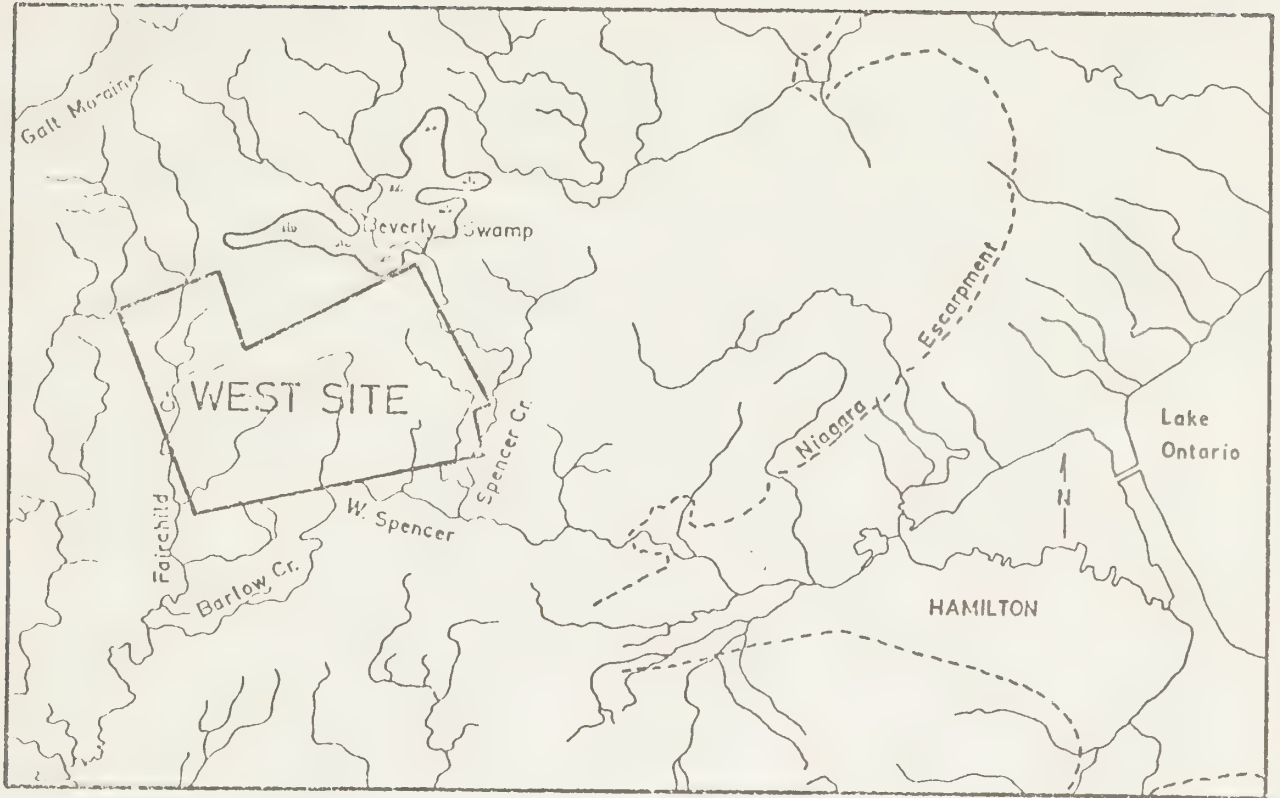
West

The western site is relatively flat except for the Westover drumlin field in its northeastern corner. Because soil is relatively thin (not exceeding 36" in depth) in most areas, it is probable that much of it would be removed to allow buildings and runways to be constructed directly on top of the bedrock. The removal of the soil cover would generate large quantities of silt in both Fairchild and Spencer Creeks. Water-borne silt would undoubtedly have a detrimental affect on the reservoir at Christie's Corners. This impoundment, which was created to reduce flooding in Spencer Creek at the Town of Dundas, would have to be dredged if it were to maintain its storage capacity.

Because bedrock is so close to the surface on the western site, it prevents both Spencer and Fairchild Creeks from forming well-defined stream channels. Both creeks, therefore, have broad, shallow flood plains. In order to drain the site adequately, a system of drainage ditches would have to be constructed, most likely by blasting trenches in the bedrock. The resultant drainage ditch network would tend to lower the water table of the area, as would the removal of vegetation on the site.

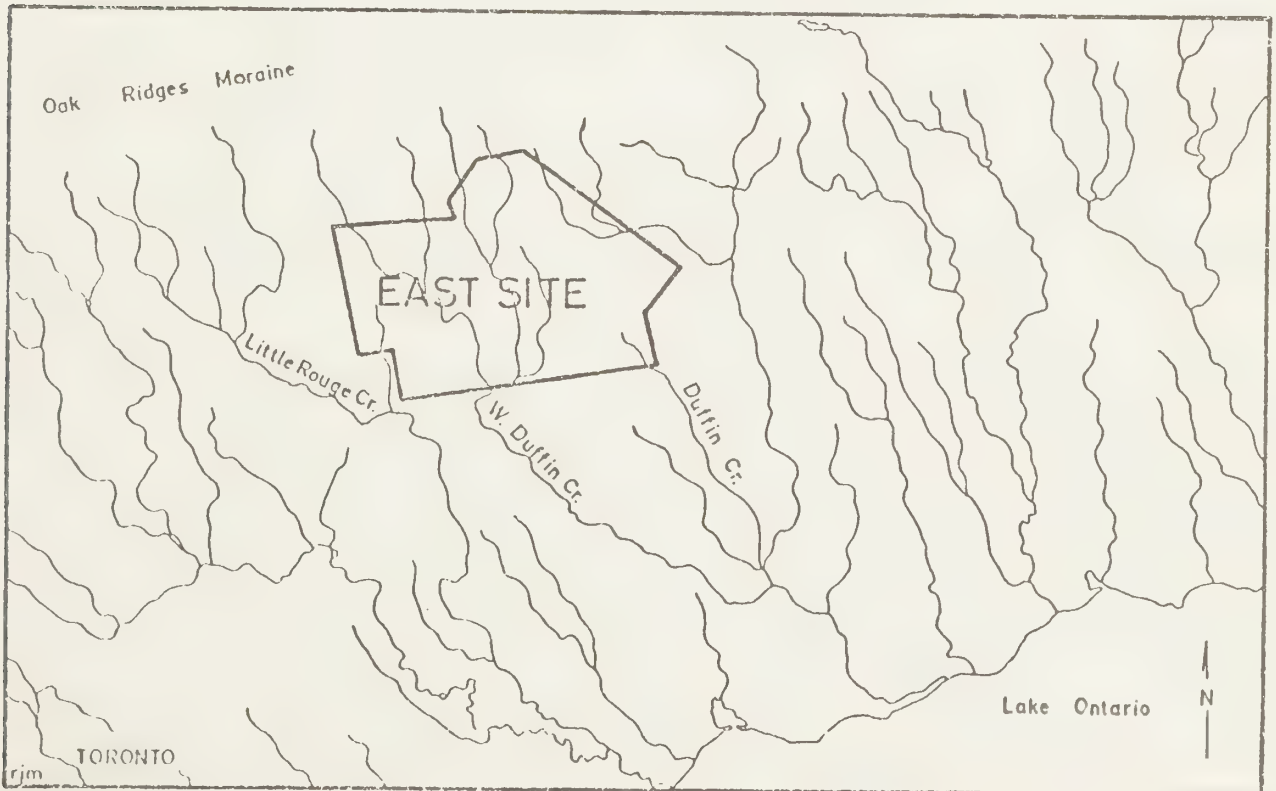
The water courses on the eastern site are well-defined and drain that site quite well. There as well, however, adequate controls would have to be observed to prevent soil erosion. More effort would be required to implement a proper drainage scheme on the western site and greater care would be essential in order to prevent silting in the shallow stream channels

MAP 6



DRAINAGE OF AIRPORT SITES

SCALE 0 1 2 3 6 MILES



which are characteristic of the area.

c) Vegetation

East

The greatest impact on vegetation within the east site during construction will result from its removal due to clear cutting of the area. This impact would not be as serious as in the western site due to the absence of any unique and extensive vegetative cover. The high percentage of developed agricultural land limits the loss of any scenic forested areas, to that growing only in the bottomlands. The removal of vegetation has immediate compound effects in relation to wildlife habitat and hydrology. With only 6.5 per cent of the total area in forest cover, the loss of nesting areas and natural food sources on the east site will be very small. The reduction of soil water retention causing runoff will add to the already high susceptibility of the soil to erosion. Without adequate controls, vegetation along stream channels on the site will be prone to disruption due to increased erosion which will in turn, result in larger quantities of silt gaining access to the water courses.

The area surrounding the site contains no vegetative features of any unique significance which stand to be disturbed by the construction of additional access roads and other service facilities.

West

Construction within the boundary of the west site would be directly responsible for the total or at least partial loss of the natural and managed vegetation as shown in section (d) of Present Status. Compared to the eastern site, the western site stands to lose a greater variety and abundance of woodlots, along with various pasture and scrub lands. The loss of this diversity and quantity of vegetation in an area of such close proximity to urban centres, would also mean the abandoning of a high class recreational area. The forest cover and creeks already support game species which provide excellent hunting and good fishing. The compound effects resulting from the loss of vegetation will be far greater than that experienced in the eastern site. The loss of such a large forested area (20.7% of the total site) will mean the removal of a significant amount of wildlife habitat and food supply. Natural trout habitat will be eliminated with the removal of protective vegetative cover along streambanks. The loss of soil-water retention and subsequent increase in runoff will magnify the flood potential, while a decrease in the soil storage capacity will intensify summer low-flow periods and increase the possibility of drought conditions. The higher frequency of flooding and drought conditions would continually disrupt flood plain vegetation downstream from this site. The location of additional access roads and facilities surrounding the site would hopefully avoid the Beverly Swamp in order to maintain

this unique natural area.

It is apparent from comparing the relative losses of vegetation due to construction, that the eastern location for the airport is favoured.

d) Wildlife

During the construction phase of the airport, the major impact on local wildlife populations would be the complete removal of natural habitat. The destruction of vegetation would cause wildlife populations to decline proportionally. Following is an interpretation of the Ontario Land Inventory maps which indicate the capability or potential of the land to support wildlife for each site, (1 represents the greatest capability, 7 the least). The construction of an airport on either site would negate this potential.

East

white-tailed deer

- rated 1 to 2
- western portions of the site are capable of highest production
- northern and eastern sectors are both well above average but food and cover plants are limited
- small amount of manipulation is required

ruffed grouse

- rated 1 to 2
- western sector is excellent while rest of the site is above average
- food and cover are limited
- moderate amount of manipulation required

- | | |
|----------------------|--|
| Hungarian partridge | <ul style="list-style-type: none">- rated 2 to 3- entire site is good to above average- food and cover again are limited- minor manipulation is required |
| European hare | <ul style="list-style-type: none">- rated 2 to 3- whole site is good to above average- food and cover are the limiting factors- minor manipulation is required |
| migrant geese | <ul style="list-style-type: none">- rated 4 to 5- most of the site is below average in terms of habitat- the degree of effort required to realize the full potential of the area, however, is very low |
| ducks & duck hunting | <ul style="list-style-type: none">- rated 7- the site supports virtually no production at present but the degree of effort required is quite low |
| ring-necked pheasant | <ul style="list-style-type: none">- rated 4- the north and east sectors of the site are average- climate and food are limiting factors |

West

- | | |
|-------------------|--|
| white-tailed deer | <ul style="list-style-type: none">- rated 3- present habitat not suitable but above average- deficient soil moisture- poor root penetration of vegetation due to shallowness of the soils over bedrock- moderate amount of manipulation required |
|-------------------|--|

- | | |
|--------------------------------|---|
| ruffed grouse | - rated 3 |
| | - present habitat not suitable but above average |
| | - deficient soil moisture and root penetration |
| | - moderate amount of manipulation required |
| Hungarian partridge | - rated 4 |
| | - present habitat is not perfect but only a small amount of manipulation is required |
| | - climate conditions limiting this species may affect the range on this site |
| European hare | - rated 4 |
| | small amount of manipulation is required |
| migrant geese | - rated 4 to 5 |
| | - present habitat is not suitable and well below average |
| | - poor distribution of habitat necessary in the life cycle of this species (i.e. distance from seclusion, water, low quality of nesting fringes, low capability to grow attractive foods) |
| puddle ducks
& duck hunting | - rated 7 |
| | - lack of free-flowing water |
| | - poor dispersion of necessary habitat |
| | - a small amount of manipulation, however, would attract this species to the area |

In terms of realized potential, the western site contains more wildlife habitat and therefore sustains larger and more varied wildlife populations than the eastern site which actually has a greater potential for wildlife production, if it were to be managed accordingly. In its present condition, the eastern site contributes little in comparison to the western area, in

terms of wildlife production.

e) Soils

Although the soils on both sites would certainly not be entirely lost during the construction phase, and a certain amount of agriculture could still be carried out until the airport became operational, agricultural use of the area would be nil when the airport is finally completed.

East

Two of the five major soil series on this site are susceptible to erosion therefore the removal of natural vegetation would make these soils extremely vulnerable to flash storms. This situation also creates a potential hazard for gullying and stream siltation.

West

The soils are extremely shallow and susceptible to erosion. Erosion here is more of a problem than on the eastern site, but this is limited by underlying bedrock. Siltation in the Fairchild and Spencer Creek watersheds would be considerable and possibly severe enough in the Spencer system to limit the use of water for fishing, body contact sports and drinking water supply.

f) Minerals

East

Although surrounding areas are rich in deposits of building materials, the east site itself is insignificant in terms of mineral wealth.

West

Some high quality sand and gravel deposits stand to be lost by locating an airport in the west, but the most valuable mineral resource within the site is limestone. Access to this readily available building material would be eliminated by the construction of an airport on the site. Limited extraction would be possible during the airport construction phases.

g) Views and Vistas

East

Except for the higher relief (90 foot hill) in the north-western section of the site, no prominent viewing area stands to be lost. Construction would require the levelling of local relief which has an average of 20 to 25 feet in vertical elevation. Since most of this site (88.3%) is involved in agricultural production, the only loss of natural scenic areas would involve the destruction of vegetation along the watercourses. Scenic attractions in the ten surrounding Conservation Areas, within a ten mile radius, are threatened by the location and construction activity of new routes and facilities servicing the airport. (see map 7).

West

Construction would eliminate a general local relief 10 to 15 feet as well as destroying excellent observation points afforded by the 80 foot drumlin in the northeast corner of the

site. Reference to section (d) of the west site Natural Resources, will indicate that a great number of natural and managed woodlots, pasture lands and scrub lands, which provide a variety of scenic attractions stand to be lost directly through their removal. The disruption of Beverly Swamp on the northern fringe of the site would certainly lead to its eventual degradation. 11 Conservation Areas within a ten mile radius of the site will be disrupted through the interference caused by construction of additional services. (see map 8).

1) Privacy

The privacy of individuals and groups will be affected by increased noise and airport activities. No accurate figures are available to anticipate the number of people who would be affected by an expanded road network, massive utility development, power line rights-of-way, etc.

East

The eastern site is almost totally made up of farmsteads and thus presents a good example of dispersed settlement. The following figures show that there are no nucleated settlements with the eastern site, and provides an estimate of the surrounding population which stands to be affected (see map 2).

<u>Number of Towns</u>		<u>Population</u>
Within site boundary - none		n.a.
Within 5 miles	7	5,580
Within 10 miles	22	46,203
Within 12 miles	34	125, 254

People seeking solitude from their urban environment in parks and Conservation Areas will also be adversely affected by these surrounding service developments. The following figures show the approximate extent of this disruption for the Conservation Areas of the eastern site, within a 10 mile radius (see map 7).

<u>Conservation Areas</u>	<u>Location</u>	<u>Acreage</u>
Within the site	None	Nil
Within a 10 mile radius	Bruce's Mill	269
	Stouffville	97
	Goodwood	307
	Uxbridge	93
	Glen Major	880
	Claremont	398
	Lake St. George	319
	Whitechurch	25
	Greenwood	682
	Duffin	298
	Milne	293
TOTAL:		<u>3,662 acres</u>

Reduction in open space in this area can be tolerated to a greater degree than in the western site, because a greater supply of recreational lands is available, especially towards the north and east of this site. Open space requirements and the demand for recreational facilities is lower in this area, according to personnel from the Department of Treasury and Economics.

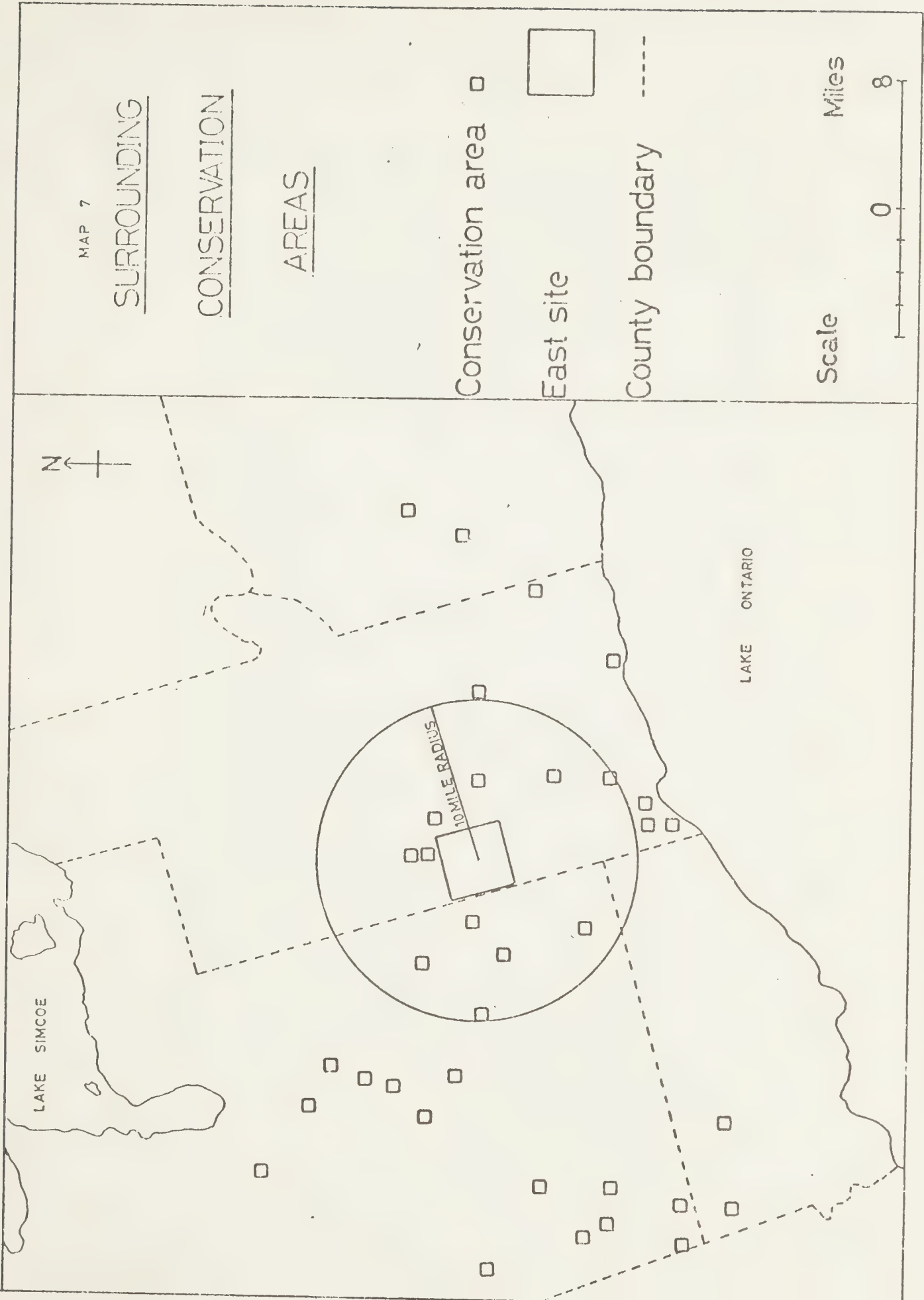
West

The following list of figures will indicate the extent to which privacy will be affected by the construction of the airport and associated service facilities (see map 3).

<u>Location</u>	<u>Number of Towns</u>	<u>Population</u>
Within the site boundary	2	178
Within 5 miles	6	354
Within 10 miles	27	45,883
Within 12 miles	37	86,359

Within the site, construction will mean a loss of two villages (a total of 178 people) and will necessitate the relocation of an active rural population.

Solitude and privacy of people seeking rest and relaxation, within surrounding parks and Conservation Areas will be adversely affected. The figures below give an estimate of the number of Conservation Areas which will be influenced (see map 8).



<u>Conservation Areas</u>	<u>Location</u>	<u>Acreage</u>
Within site	None	Nil
Within 10 mile radius	Christie's Reservoir (Crook's Hollow)	800
	Valens	528
	Chilloco	93
	F. W. R. Dickson	113
	Puslinch	306
	Shade's Mills	150
	Beverly Swamp	11,000
	Mountsberg	11,020
	Tew Falls	125
	Bannister-Wrigley Lake	216
	Summit Bog	35
	TOTAL:	<hr/> 5,583 acres <hr/>

It is obvious that the development of the airport will have a very heavy impact on the Conservation Areas surrounding the west site. The demand for recreation open space is quite high in this area due to heavy demands generated by the Toronto Region, Hamilton and the Golden Triangle.

It is therefore quite evident that open space is a much more critical commodity around the western site and is not in as short a supply on the eastern site.

MAP 8

SURROUNDING

CONSERVATION

AREAS

Conservation area □

West site

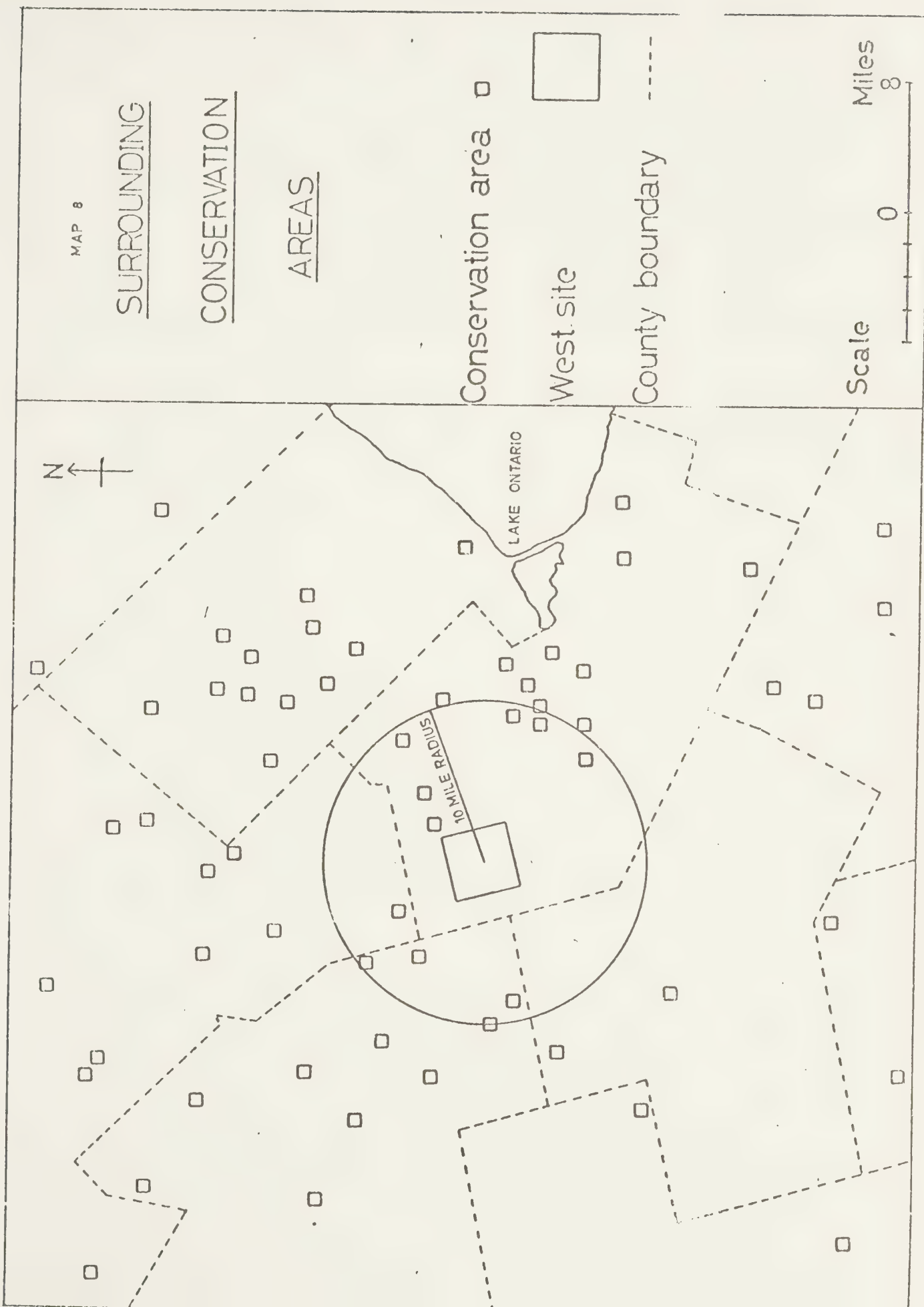
County boundary - - -

Scale

Miles

0

8



2) Operation

a) Air

The Air Management Branch of the Department of the Environment has stated that most of the air pollution in the airport area would result from vehicular travel. An emission inventory for Metropolitan Toronto carried out by the Air Management Branch in 1969, including Malton and other airports, indicated the following:

	<u>Sulphur</u> <u>Dioxide</u>	<u>Particulate</u>	<u>Nitrous Oxides</u>	<u>CO</u>	<u>Hydrocarbons</u>
Aircraft					
% of Total	0.4%	1.5%	.33%	.25%	5.6%
Automobile					
% of Total	.56%	6.2%	18.56%	97.84%	68.78%

It is evident, therefore, that ground traffic using the airport site is a larger contributor to air pollution than the aircraft, especially in terms of oxidants and particulate matter.

East

Airborne pollutants from the easterly site would be carried by westerly winds, so that Toronto and other urban centres will not be additionally affected by an operational airport on that site.

West

The pollutants from the west site would be generally blown towards the Hamilton-Oakville-Toronto area. However, during an east wind airborne pollution from Hamilton would be carried towards the western airport site. This type of pollution, primarily composed of particulate material and oxidants, would

mix with the petrochemical smog of the airport and cause visibility problems over the western site. The constant presence of industrial air pollution in nearby Hamilton may continually affect airport operations on the west site.

The increase in airborne oxidants produced by the airport and automobile traffic, would greatly add to the already severe oxidant problem present in the Hamilton area. This could very well cause vegetation damage as has been experienced north of Lake Erie. An airport on the east site would have less of a tendency to create such problems. Due to the close proximity of the west site to the Beverly Swamp, visibility around an airport in the vicinity of the swamp would also tend to be reduced by ground fog typical of such an area, (see figure 4).

b) Water

During construction of the airport, surface drainage patterns would be greatly simplified by channelization of existing creeks and levelling of uneven topographical features. These actions, by their very design, would result in a larger, faster runoff from the site. The removal of natural vegetation and its replacement by turf and asphalt would tend to increase runoff volumes as well as reducing the storage capacity of the soil on and immediately surrounding the site. This reduction of soil storage capacity would cause a lowering of the water table on the area.

Large amounts of runoff would rapidly enter the drainage system so that water would be quickly drawn off the site. Peak flows in times of heavy rainstorms would tend to increase silt loads which are a result of unrestrained runoff.

East

The airport site is drained into two sparate creek systems... Duffin and Little Rouge Creeks. Duffin Creek and its major tributary, West Duffin Creek, have fairly steep profiles (see figure 1) and are deeply incised into the landscape.

Little Rouge Creek, where it touches the site, flows through a broad valley and has a flat profile. The greatest percentage of the site is either cultivated or in pasture. This, combined with the rolling topography of the site and the soil type, allows rapid runoff of rainfall. The presence of the airport on the site would not appear to affect the runoff rates drastically.

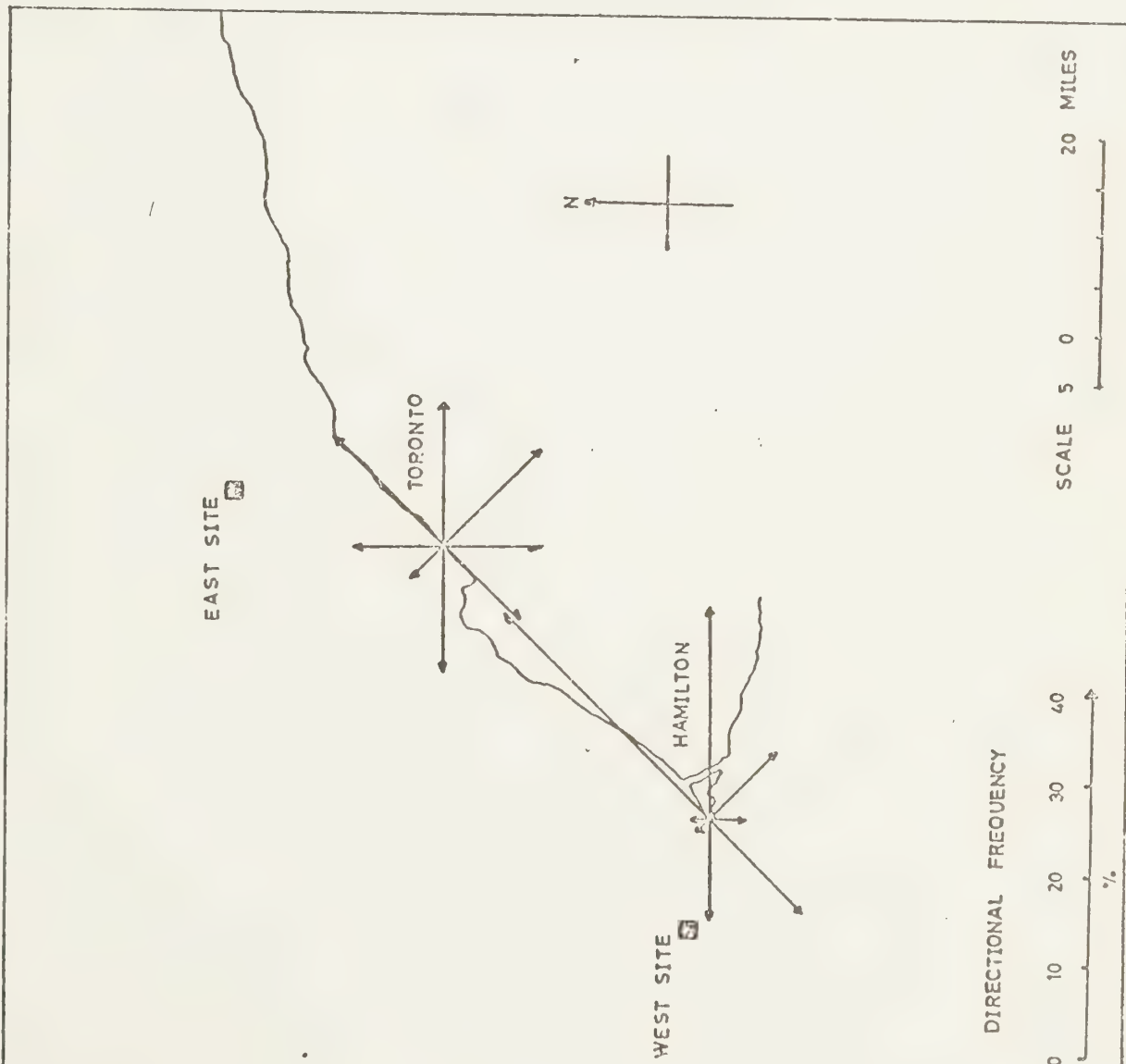
The water table of the site would no doubt be lowered,, but as the terrain is dissected by creek valleys, the effects would not be felt in a very large area outside of the site.

West

Because of the poorly drained conditions of the western site, complete clearing of natural vegetation would greatly induce more substantial amounts of runoff. Spencer Creek as it exists, would be incapable of handling the larger peak flows and would tend to flood its banks. The large numbers of drainage ditches, which would be required by an airport facility on the site, would effectively lower the water table in the area and would influence surrounding regions as well. The lowered water table would possibly affect the Beverly Swamp lying to the north of the site by altering the unique floral and faunal characteristics of the area and reducing its present capacity to supply

WIND ROSE - TORONTO, HAMILTON

१
अथर्ववेद



A 4 year period of the rise of the idea of the city of Hamilton, Ontario, is not a bad time to visit the city.

water to the lower reaches of Spencer Creek. Due to its biological and geological significance, much of the Beverly Swamp has been acquired by the Hamilton Region Conservation Authority who are continuing with the purchase of land in the area.

The Town of Dundas and the Village of West Flamborough derive their water supplies from the Spencer Creek, therefore additions of even small quantities of gas and oil, which could result from accidental spills at the airport, would seriously affect water quality, and therefore, the potability of the water in Spencer Creek.

Therefore, the effects of a proposed airport on the western site would be much greater than those anticipated on the eastern site. The problems arising from rapid runoff would be much more seriously felt in the west and the lowering of the water table would also be more extensive than would be on the eastern site. Water quality deterioration would be much less detrimental on the eastern site since sizeable human populations utilize the surface water sources on the western site.

c) Vegetation

East

The day-to-day operations of an airport will mean that all woody vegetation within the site will be totally removed and replaced by man-made grasslands with controlled growth. The surrounding vegetation stands to be affected by long-term hydrologic consequences and increased air and water pollution. These changes will have limited effects on the vegetation around the

site because the sparse floral community will be restricted to creek bottomlands and adjacent woodlots to the north and east. Natural vegetation surrounding the site will no doubt be affected by increased airborne contaminants. The reduction in groundwater capacity and the increase in surface runoff will have long-term consequences in relation to magnifying the present extremes between minimum and maximum flow conditions. Deeper river incisement will result from increased erosion which will alter the present vegetative growth along streambanks.

West

All natural vegetation will be permanently erased within the actual airport confines once construction is completed. This will be a substantial loss to the western site, because of the quality and diversity of natural vegetation growth that is presently found there. Increased runoff will have the same effects on streambank vegetation and general geological characteristics of the streams as they will in the eastern site, however airborne contaminants will have a greater affect on the Beverly Swamp area which lies adjacent to the west site. Air pollution will be compounded by the additional influence of climatic fog and industrial pollution from the Hamilton area. Surface runoff carrying sewage wastes and chemical contaminants from the airport site will no doubt adversely affect water quality in the Spencer Creek area.

It follows, therefore, that the western site peripheral areas, notably the Beverly Swamp, will be much more greatly affected by airport operations than will peripheral areas around

the eastern site.

d) Wildlife

East and West

Airport operation will effectively drive wildlife from nearby suitable habitats. Problems arising from high noise levels, greater human use, increased highway traffic, prohibition of hunting, use of chemicals and utilization of mowed grass cover would virtually destroy the natural aspects of this environment. Accurate predictions of how well the ecological balance would be maintained around each site is virtually impossible, although it can be safely concluded that it would be irreparably damaged.

Seasonal movements of migratory birds will conflict with the airport operation for some time on either of the proposed sites. Ducks and geese fly over the east site to a greater degree than over the western site, but the west site lies below a rather unique flyway -- that of the whistling swan. Populations of meadow mice and voles will increase due to the grass cover increment usually managed around airport sites and birds of prey will, therefore, become quite numerous, especially during the fall migration.

Substantial deer herds range to the immediate north of each site. Deer require relatively quiet periods during the mating season in order to ensure successful reproduction. Jet engines at low altitudes obviously generate enough noise to successfully interrupt the rut of these deer.

Silt and salt generated by the airport operation will, no doubt, enter the natural drainage channels and would make such creeks and streams undesirable for aquatic life, if chemical concentrations become too high.

Thus, it appears that both wildlife populations and habitats will be impaired to an equal extent on each site by the airport operation, presuming construction and operation phases are somewhat similar on each site.

e) Soils

East

Over 11,800 acres or roughly 88% of the soils on this site are cleared for agricultural crops. Virtually all of this land is Canada Land Inventory Class 1. Airport operation will severely restrict this area for agriculture, if not totally eliminating it for these purposes. Increased peak runoff flows may have a tendency to produce erosion problems. Proper channelization work would be costly and extensive on the eastern site to ameliorate potential soil damage.

West

Over 10,300 acres of developed agricultural soils stand to be lost within the site but these are relatively poor, never ranking above Class 3 in the Canada Land Inventory. The capability of these soils is not great but in fact their potential is being more realized than those in the eastern site, due to the presence of bonafide farmers.

Relative to agricultural production, less developed land on the west site is producing equal quantities as the entire eastern site. Therefore, even if all of the eastern site was converted to various airport functions, only one half of the total current production of the combined efforts of the two sites would be lost.

f) Minerals

East and West

The airport operation would effectively eliminate potential mineral extraction on either site. The east site stands to lose very little but virtually all of the western site is underlain by valuable deposits of dolomitic limestone.

g) Views and Vistas

East

The predominance of agricultural activity within this site would limit the loss of natural views caused by the daily operation of the airport. Poor visibility and annoying sound disruptions would increase from the day-to-day activity of the airplanes. Scenic attractions offered by the Oak Ridges Moraine and surrounding parks and Conservation Areas (3,393 acres) would be adversely affected by visual air and sound pollution.

West

Once the airport is in full operation, views and vistas offered from atop the drumlins and within the forested tracts on the site would be totally negated. Higher air pollution

levels coupled with lowered visibility and increased noise levels would affect the tourists and residents view of the rural areas. These factors would also aggregate to cause disruption in a total of 5,583 acres of parks and Conservation Areas which surround the area. The unique natural experience gained by Beverly Swamp would certainly be degraded by operational activities in an adjacent airport.

It is quite evident, therefore, that the naturally occurring aesthetic values of the western site would be, to a greater degree, affected by the operation of an airport than would those of the eastern site.

h) Privacy

East

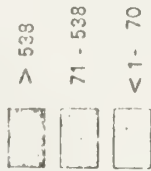
Studies have indicated that the noise level from jet aircraft is the most undesirable aspect of the airport operations in relation to surrounding populations. Also of importance is the accident risk, air pollution, constant flashing lights and bothersome surface traffic. It has been stated previously that approximately 125,000 people within a 12 mile radius will be affected by these factors. Although the impact on surrounding populations will be great, there is a much greater availability of open space in the eastern site which will allow flight paths to be programmed and therefore less disruptive to rural and urban-centred populations (see map 9).

West

Noise pollution would affect a population of 86,000 people in a 12 mile radius. In comparison to the eastern site a smaller number of people would be affected, but their dispersed pattern in the western site would not allow much freeboard for developing flight paths which would tend to decrease the annoyance to residents (see map 9).

Population density, Southern Ontario, 1961 *Densité de la population, Ontario méridional, 1961*

Persons per square mile / Habitants au mille carré

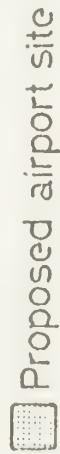


Except for isolines 1 and 7, the value of each isoline is equal to 1.5 times the value of the next lowest isoline.

A l'exception des isolignes 1 et 7, la valeur de chaque isoligne équivaut à 1.5 fois la valeur de l'isoline intérieure suivante.



The isoline intervals are weighted in favour of areas of low population density in order to avoid congestion in the urban areas.
Les intervalles des isolignes sont pondérés en vue de favoriser les zones de faible densité de population et d'éviter la trop forte concentration des lignes dans les zones urbaines.



MAP 9



Source: Ontario Economic Atlas, 1969

IV CONCLUSIONS

1. In general, the soils of the east site are Class 1 for agricultural purposes while those of the west range from Classes 3 through 6 and tend to be less fertile. From the point of view then of the soils resource, the greater loss will result with an airport on the eastern site.
2. Farms on the east site are more numerous than those on the west, although many appear to be vacant and in need of repair. In the west they are to a greater degree modernized and more successful in their operation.
3. Agricultural productivity of the eastern site is equalled at present by that of the western site. The fact that much of the land in the east has been purchased for development of country estates or speculative purposes has limited its use for agriculture. Relative then to productivity of food and forage, an airport on either site would have approximately the same impact. More viable farms units will be disrupted in the west however, imposing social adjustment problems on the more numerous inhabitants of the area.
4. Due to efficient drainage on the eastern site, development of an airport in the area would not significantly alter flooding problems to the degree which would occur in the western site. The west is presently very poorly drained due to shallow soils in the area. The presence of an airport

with its many associated hard-topped surfaces (runways, parking lots, etc.), would compound the problem of poor drainage by causing total surface runoff in some areas. It is apparent that more work on creek channels in the area of the western site would be required to prevent such problems.

5. Any alteration of water tables due to the presence of a well-drained airport site will do less harm in the east than in the west. The Beverly Swamp, which is a significant biological area in the region of the western site, depends, to a degree, for its significance, upon the groundwater present on the site which in turn relates closely to the existing water table.
6. Any change in water quality of the creeks in the vicinity of the east or west sites due to the construction or operation of an airport would present less of a problem in the east. In the west there are several communities and conservation areas downstream of the site relying on the Spencer Creek as a water supply.

In terms of the existing fishing resource, the areas are equally comparable in that the creeks of both regions support significant game fish populations. Any alteration of water quality in either area through removal of vegetative cover or through chemical or silt pollution will most certainly have a detrimental affect on these populations.

It is critical, regardless of where the airport facility is to be located, that extreme care be taken to prevent contamination of any of the creeks with the result of degrading water quality. A point here to be considered is that while much of the east site and areas downstream are posted against anglers, the west site remains unposted.

An airport facility then, on the east site, would not have as important an impact on the fishery resource as it would on the west site where fishermen presently have access to the area. Similarly, any creek pollution downstream as a result of the construction or operation of an airport in the east would have a lesser impact, as fishermen aren't permitted to fish the area. On the other hand, where fishing is permitted downstream of the west site, creek pollution generated by an airport would most certainly affect the existing fishery.

7. There are fewer small, rural villages in the vicinity of the eastern airport site which stand to be affected by an operational airport in the area than in the region of the western site.
8. There is considerably less natural vegetation to be affected by locating an airport on the eastern site than to locate one on the western site.

9. There are few natural woodlots and no County Forest plantations on the eastern site to be affected by the presence of an airport. The western site, on the other hand, possesses numerous natural woodlots and several County Forests managed by the Department of Lands and Forests.
10. Although the wildlife capability of the eastern site exceeds that of the western site, it has not realized this potential to any significant degree. On the other hand, the western site with a lesser capability, because it has retained natural and managed woodlot cover along with varied scrub growth, realizes a great deal of its potential with the result that there are significant numbers and great variety of wildlife in the area. An airport facility then, located on the eastern site, would serve to disrupt to a considerably lesser degree, natural wildlife populations.
11. Hunting, as a form of recreation, would be affected to a lesser degree if an airport were constructed on the eastern site as there are few game animals in the area.
12. By comparison, the ecological inter-relations of the eastern site are far less complex than those of the western site. An airport in the east would have less of an effect on the existing ecosystem and permit preservation of the more unique system in the west.

13. Existing air quality over the eastern site is superior to that of the western site and favours location of the airport. The west site is handicapped by its proximity to the City of Hamilton, 17 miles away. Gaseous effluents from heavy industries of that city pollute the atmosphere and reduce visibility in the area considerably. Easterly winds in the area result in movement of the city's gaseous plume into the region of the western airport site which reduces its favourability for the location of an airport.
14. The presence of an airport on the eastern site would represent considerably less of a loss to extractive industries. On the other hand, locating the airport on the western site would prevent any further retrieval of sand, gravel or in particular limestone from the area.
15. An airport in the east would have little or no direct affect on recreation-oriented activities as there are no Conservation Areas or recreation facilities on the site. In the west, however, construction of an airport on the site intended would mean elimination of the unique "African Lion Safari" at Rockton, and as well, removal of the pioneer village on Highway 52. Within a 10 mile radius of the two sites an operational airport stands to affect about the same number of established Conservation Areas. There is, however, a larger total land holding represented by the surrounding Conservation Areas in the west than in the east.

16. Due to the relative abundance and dispersal of small towns and cities between the areas generally east and west of Toronto, it is apparent there is more open space in the eastern region. For this reason, location of an airport in the east would represent less of an impact in terms of loss of open space than would an airport in the west. In the vicinity of the western site, the demand for open space generated by increasing population of the Golden Triangle (Guelph, Kitchener-Waterloo, Galt-Preston) and the Golden Horseshoe (Toronto-Oakville, Burlington, Hamilton, Dundas, Grimsby, St. Catharines) suggests that its loss for the purpose of building an airport will have serious consequences for the future of the area. This is not to mention the additional open space which will be lost to secondary industries invariably locating in the vicinity of the newly established airport.
17. The areas surrounding the two proposed airport sites are in general, similar to the individual sites. Because the region surrounding the east site is for the most part cleared agricultural land containing no outstanding significant biological or natural areas, an airport in the vicinity would pose no particular environmental problems. This is assuming that an operational airport will exert the same affect on the deer populations to the north of each area and, therefore, cancels itself. Any affect, for example,

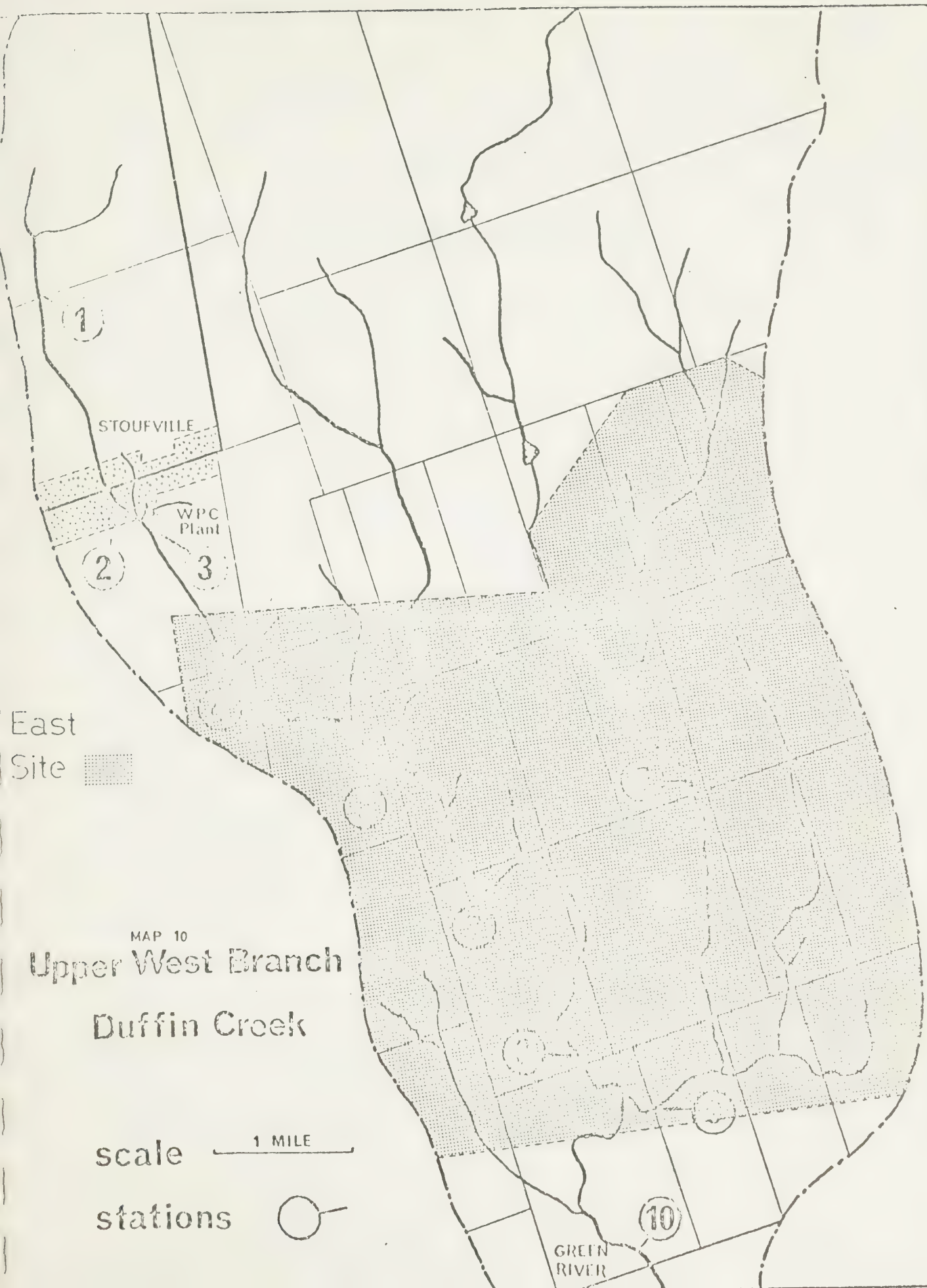
on the water table could have very important consequences, not only relative to the Beverly Swamp to the north which depends on a constant groundwater level, but also in terms of the vegetation of the areas which provide habitat for a diversity of wildlife species. From the standpoint then of the surrounding environment, an airport on the eastern site would have less of an undesirable impact than would a similar facility in the western site as proposed.

18. One has only to drive through the two sites being discussed to appreciate just what the respective losses would be in terms of general aesthetics and features of the natural environment. The west site is a very attractive natural area and stands to lose a great deal in terms of the various natural resources. The east site, although not nearly as attractive as the west site, will also lose if an airport is constructed in the area, however, not to the same degree as would be apparent in the west.

WATER QUALITY OF WEST DUFFIN CREEK

[illegible]

1	0.6	16	275	0.03	0.0	0.0	0.54	0.1	0.9	5,500
2	0.8	2	477	0.09	0.0	12.5	0.90	11.8	24.0	22,000
3	1.5	48	333	0.09	tr.	1.5	0.85	4.5	5.9	26,900
4	2.4	48	373	0.01	0.02	2.8	1.12	3.9	4.9	7,080
5	2.3	20	354	0.12	0.03	2.5	1.19	4.3	5.1	18,600
7	1.6	10	318	0.09	0.02	0.8	0.81	2.5	3.5	3,160
8	1.5	11	278	0.08	0.01	0.5	0.69	2.8	4.4	632
9	0.9	8	241	0.05	0.0	0.0	0.41	0.1	0.1	1,820
10	1.3	8	237	0.08	tr.	tr.	0.47	0.5	0.7	214



APPENDIX II

WATER QUALITY OF DUFFIN CREEK

Water Quality of Duffin Creek taken from January-
September, 1971 at first concession below Highway
No. 7 (after O.W.R.C.)

		No. of Samples	Max.	Min.	Aver.	Median
Coliform/1000 ml		4	77,000.0	224.0	19436.0	260
Water temp. C		4	24.0	0.1	9.0	
D. O.	p.p.m.	4	8.0	5.0	6.0	
5-Day B.O.D.	p.p.m	4	3.0	1.6	2.4	
Total Sol.	p.p.m.	4	600.0	340.0	425.0	
Susp. So.	p.p.m.	4	310.0	10.0	98.0	
Turbidity	Units	4	110.0	6.0	37.8	
Conductivity 25C	UMHO	4	506.0	363.0	448.0	
Total P as P		4	0.65	0.02	0.20	
Sol. P as P		4	0.02	0.01	0.01	
NH ₃ as N	p.p.m	4	0.04	0.02	0.03	
Total Kjehl	p.p.m.	4	2.60	0.30	1.02	
No ₂ as N	p.p.m.	4	0.02	0.00	0.00	
No ₃ as N	p.p.m.	4	1.10	0.29	0.56	
Chloride	p.p.m.	4	16.0	8.0	12.0	

APPENDIX III

WATER QUALITY OF SPENCER CREEK

(Analysis of water samples taken at Valens, January to September of 1971)

		No. of Samples	Max.	Min.	Aver.	Median
Coliforms/1000 ml		16	1700.0	1.0	256.0	72.0
Water temp. C		16	25.5	2.0	12.6	
D.O.	p.p.m.	16	12.0	6.0	9.3	
5-Day B.O.D.	p.p.m.	15	5.5	1.2	2.6	
Total Sol.	p.p.m.	15	400.0	180.0	282.0	
Susp. Sol.	p.p.m.	15	15.0	5.0	6.0	
Turbidity	Units	15	15.0	3.0	4.8	
Conductivity 25C	UMHO	15	580.0	244.0	423.0	
Total P as P		15	0.10	0.02	0.04	
Sol. P as P		15	0.01	0.00	0.00	
NH ₃ as N	p.p.m.	14	0.57	0.02	0.18	
Total Kjcl.	p.p.m.	15	2.00	0.42	0.92	
NO ₂ as N	p.p.m.	15	0.03	0.00	0.01	
NO ₃ as N	p.p.m.	15	0.52	0.01	0.20	
Chloride	p.p.m.	14	9.0	5.0	6.0	
Hardness	p.p.m.	3	286.0	210.0	236.0	
Alkalinity CaCO ₃	p.p.m.	3	250.0	184.0	206.0	
Total Iron	p.p.m.	3	0.35	0.30	0.32	
pH at lab	p.p.m.	3	8.3	7.9	8.2	

Partial Analysis of Fairchild Creek
Water Sample Taken at Troy May 9, 1962

pH @ 25C	8.30	p.p.m
P alkalinity	18.0	p.p.m.
M alkalinity	260.0	p.p.m.
Chlorides	18.0	p.p.m.
Hardness Total	280.0	p.p.m.
Calcium Hardness	186.0	p.p.m
Magnesium		
Hardness	94.0	p.p.m.
Total Dissolved		
Solids	347.0	p.p.m.
Loss on ignition		
@ 500 C	76.0	p.p.m.
Turbidity	Clear	

APPENDIX IV

Aquatic Life in Duffin Creek (After Lands and Forests, 1971)

AQUATIC INVERTEBRATES

caddis fly
may fly
stone fly
black fly
midges
Hellgramites
dragon fly
damsel fly
riffle beetles
water striders

ripple bug
water boat man
sow bug
scud
cray fish
leeches
snails
crane fly
water penny
clams

FISH

speckled trout
pumpkin seed
rock bass
white sucker
brown bullhead
madtom
northern redbelly dace
blacknose dace

creek chub
common minnow
bluntnose minnow
pearl dace
Johnny darter
rainbow darter
hog sucker
mottled sculpin

APPENDIX V

Aquatic Life in Spencer Creek (After Lands and Forests, 1970)

GENERAL AQUATIC VEGETATION TYPES

Arrowhead
Sedges
Bullrushes
Green algae
Duck weed
Pond weed
Stonewort
Water-lillies

AQUATIC INVERTEBRATES

crayfish
snails
damsel flies
dragon flies

caddis flies
stone flies
may flies

FISH

brook trout
white sucker
central mudminnow
northern redbelly dace
finescale dace
red side dace
common shiner
fathead minnow

long nose dace
creek chub
pearl dace
brook stickelback
Johnny darter
mottled sculpin
brown trout
blacknose dace

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